Manitoba
Agriculture

Report No. 10

MANITOBA REGIONAL Sunflower PERFORMANCE TESTS • 1989

A Report on Tests of Commercial Hybrids
Sponsored by The Manitoba Sunflower Committee

MG-11787 (REV. 90)

92-06361/

MANITOBA REGIONAL

SUNFLOWER PERFORMANCE TESTS

1989

Sponsored by the

MANITOBA SUNFLOWER COMMITTEE

Members of the Committee:

J.R. Rogalsky, Manitoba Agriculture, Chairman
J.R. Dean, Manitoba Agriculture, Secretary-Treasurer
B. Andrews, Manitoba Agriculture, Carman
D. Richard, University of Manitoba, Winnipeg
W. Dedio, Agriculture Canada, Morden
K. Rashid, Agriculture Canada, Morden
C. Grant, Agriculture Canada, Brandon
E. von Graevenitz, Agriculture Canada, Winnipeg
J. Kehler, C.S.P. Foods Limited, Altona
E. Klassen, Manitoba Pool Elevators, Winnipeg
K. Clear, Canadian Grain Commission, Winnipeg
B. Miller, Sunflower Producer, Stockton

Tests Conducted By:

Dr. W. Dedio, Research Scientist, Agriculture Canada, Morden (Morden, Altona, Holland and Neepawa sites)

Dr. K. Rashid, Plant Pathologist, Agriculture Canada, Morden (Morden and Neepawa disease nurseries)

Diane Richard, Department of Plant Science, University of Manitoba, Winnipeg (Lyleton site)

Dr. C. Grant, Research Scientist, Agriculture Canada, Brandon (Brandon site)

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INTRODUCTION

The Manitoba Sunflower Committee was organized under authority of the Minister of Agriculture for Manitoba to provide a vehicle for testing sunflower cultivars in Manitoba.

The Committee has now conducted performance trials for 10 consecutive years. The performance data generated through the trials has been used in support of registering sunflower hybrids in Canada. Generally, a minimum of 2 years performance data is required in order to determine the acceptability of a hybrid for registration. In addition, the performance data provides helpful information to sunflower growers in selecting hybrids for their farm production.

The 1989 growing season was characterized by below average precipitation and above average temperatures which developed in mid-July. This combination of growing conditions resulted in drought stress in many cereal and oilseed crops. However, sunflowers tolerated these conditions better than other oilseed crops, and produced satisfactory yields.

The Sunflower Committee annually conducts a fall tour which provides an opportunity to observe the performance of hybrids at various test sites in the province.

We hope the services performed by the Committee will continue to be helpful to sunflower breeders and producers.

J.R. Rogalsky, Chairman,
Manitoba Sunflower Committee.

1990 RECOMMENDED LIST

Sunflower Hybrid Descriptions

Hybrid Oil Type	Company	Yield as % of Checks[1]	Years Tested	Days to Maturity	% Oil (10% Moist.)	Height		Resistance to		
						cm	(in)	Rust[2]	Verticillium Wilt	Downy Mildew[3]
205	Cargill	94	5	114	42.7	155	(61)	Fair	Good	Fair
207	Cargill	108	5	116	38.9	170	(67)	Good	Good	Poor
SF 103	Cargill	104	5	116	39.6	169	(67)	Fair	Good	Poor
SF 187*	Cargill	110	3	117	40.7	134	(54)	Good	Good	Poor
6240*	Pioneer	102	3	111	43.6	152	(60)	Fair	Good	Good
6440*	Pioneer	103	3	117	43.5	161	(63)	Fair	Good	Good
Cadet*	Jacques	98	3	108	43.0	140	(55)	Fair	Good	Fair
Capri*	Jacques	103	3	115	44.1	142	(56)	Fair	Good	Poor
Challenger	Jacques	100	5	113	42.6	147	(58)	Fair	Good	Fair
Dak. Gold II	SeedTec	93	5	111	44.9	149	(59)	Fair	Good	Poor
DO 164	Dahlgren	94	5	113	40.9	159	(63)	Fair	Good	Good
DO 707*	Dahlgren	105	3	115	42.3	146	(57)	Fair	Good	Fair
DO 855	Dahlgren	93	5	113	42.0	153	(60)	Good	Fair	Good
IS 7000	Interstate	92	5	111	43.4	150	(59)	Fair	Good	Poor
7101	Interstate	94	5	113	41.7	156	(62)	Fair	Good	Good
IS 7111	Interstate	99	5	113	43.8	153	(60)	Fair	Good	Poor
MRS 40*	Interstate	92	3	108	41.5	137	(54)	Fair	Good	Poor
K 837	King Agro	93	4	107	41.0	166	(65)	Good	Fair	Poor
S 1296	NK	102	5	112	42.7	149	(59)	Fair	Good	Fair
S 330	SeedTec	98	5	117	40.9	155	(61)	Fair	Good	Poor
422	Sigco	93	4	109	40.7	143	(56)	Fair	Good	Poor
452	Sigco	101	5	116	43.2	150	(59)	Fair	Good	Good
465A*	Sigco	104	3	117	41.6	151	(59)	Fair	Good	Good
Sunwheat 101[4]	SeedTec	85	4	107	38.3	93	(37)	Fair	Good	Fair
Trisun 849*	Sigco	90	3	116	41.8	160	(63)	Fair	Fair	Poor
Non-Oilseed Type					**Seed Size % over 20/64**					
D 131	Dahlgren	105	5	116	30	154	(61)	Good	Fair	Poor
R. H. 2141	Agway	104	5	114	24	164	(65)	Fair	Fair	Poor
954	Sigco	99	5	115	58	158	(62)	Fair	Good	Poor
964	Sigco	104	5	110	39	151	(59)	Fair	Fair	Poor
974*	Sigco	101	3	117	74	167	(66)	Fair	Good	Poor

**On recommended list for the first time.*

[1] *Mean of hybrids Cargill 205, Cargill 207 and IS 7111, 1985-88 all Manitoba: 2526 kg/ha (2255 lb/acre).*

[2] *Resistance indicated is to race 1 at Morden. Hybrids are susceptible to other races (see Comments).*

[3] *Resistance indicated is to race 2. Hybrids are susceptible to race 3. currently established in Manitoba.*

[4] *Sunwheat 101 is a dwarf sunflower hybrid which requires specific management practices (see comments).*

Table 1. Manitoba Sunflower Committee Trials - 1989 Oilseed Summary

Variety	Yield (kg/ha)	Oil, %	Days to 80% bloom	Days to mature	Height (cm)	Density (kg/m^3)	Wt/1000 seeds (g)	Protein (%)
DK 433	2790	49.8	75	121	141	416	56.8	44.8
A61030	2667	49.4	70	116	131	450	50.4	45.0
Sig 452	2530	50.3	72	119	138	442	44.4	41.8
Sun 268	2516	47.8	73	115	150	413	58.0	45.3
DO 707	2471	48.8	69	119	133	443	49.0	43.4
SF 187	2450	45.9	74	120	125	402	41.7	47.1
SF 103	2447	45.4	73	118	153	434	46.4	43.5
S 330	2431	47.8	72	121	142	441	44.2	43.8
Sig 465A	2405	47.9	73	120	141	445	44.1	45.7
P 6440	2401	49.1	75	121	147	415	43.8	45.2
Capri	2384	51.1	71	119	131	444	47.9	42.9
C 207	2374	42.8	74	118	152	442	51.3	45.8
C 16230	2363	46.7	75	120	144	423	44.9	43.6
DK 3861	2342	50.5	77	123	144	424	43.3	43.2
1513	2319	53.9	74	117	134	458	47.3	43.3
8713	2316	48.1	73	122	137	450	45.2	42.4
DO 827	2316	48.5	69	116	135	453	47.5	43.8
Hysun 340	2307	48.1	73	117	136	385	48.6	43.3
DK 399	2290	49.7	71	115	128	435	45.9	43.1
DK 3840	2281	49.3	75	119	140	439	40.7	43.7
S 1296	2281	48.6	69	113	137	450	48.2	44.5
S 314	2275	47.1	76	123	146	413	44.5	43.5
C 205	2263	49.6	75	116	140	453	46.6	45.3
S 310	2261	49.4	75	117	129	442	38.5	42.7
P 6240	2256	50.6	73	112	140	441	47.4	44.8
Sun S600	2250	48.4	70	115	143	451	48.8	44.4
P 3617	2243	51.6	74	114	143	443	46.0	42.8
MRS 45	2242	44.9	72	113	141	409	56.2	44.7
HO 41	2218	49.1	74	114	139	417	54.5	44.2
880165	2210	52.1	76	120	146	408	41.8	39.6
IS 7101	2209	47.9	73	115	146	421	41.0	43.3
IS 3311	2209	49.7	77	123	144	425	41.9	43.0
DO 164	2202	46.3	71	115	148	434	47.6	43.9
Challenger	2190	49.7	71	116	134	439	42.1	44.1
IS 7111	2187	50.8	72	115	140	426	50.9	44.3
U65099	2182	49.2	70	115	150	410	51.9	44.7
DK 3946	2172	50.2	69	111	129	434	49.7	42.8
DO 855	2171	48.7	71	114	138	442	51.2	44.8
Cadet	2156	48.7	68	110	132	452	46.9	45.4
DK 392	2134	51.3	68	110	124	436	47.9	42.7
MRS 41	2134	49.7	77	120	141	416	42.9	43.8
Sig 422	2121	46.2	68	114	132	463	50.6	46.9
K 837	2095	47.9	68	108	156	426	55.5	45.1
Tri 849	2088	48.1	74	118	149	418	43.7	46.0
2439	2081	47.7	69	114	132	428	48.7	45.8
Dakgold 2	2065	52.0	72	113	134	426	44.3	43.0
IS 7000	2054	50.6	69	113	137	419	55.5	45.2
SW 747	2031	48.8	72	112	143	433	42.2	48.0
72001	2023	47.8	77	122	143	393	45.0	38.1

(Continued)

Table 1 (cont'd). Manitoba Sunflower Committee Trials - 1989 Oilseed Summary

Variety	Yield (kg/ha)	Oil, %	Days to 80% bloom	Days to mature	Height (cm)	Density (kg/m^3)	Wt/1000 seeds (g)	Protein (%)
SW 7893	1959	51.1	69	108	137	427	48.9	41.2
MRS 44	1920	49.4	70	105	138	405	46.5	45.2
MRS 42	1889	48.9	71	107	138	409	49.5	46.4
Sunwheat 101	1856	43.0	63	110	90	432	48.1	46.1
SW 7891	1781	52.8	69	107	145	426	44.0	42.4
MRS 46	1756	49.2	71	105	142	425	44.1	44.8
880213	1633	44.6	56	104	91	415	57.4	49.2
MRS 40	1569	48.7	68	111	127	441	44.3	45.1
Mean	2201	48.8	72	115	137	430	47.4	44.2

Locations included Altona, Brandon, Holland, Morden, Neepawa

Table 2. Performance Data from Morden Oilseed Sunflower Trial, 1989

Hybrid	Yield kg/ha	Oil %	Days to 80% bloom	Days to maturity	Height cm	Density kg/m^3	Wt/1000 seeds, g	Self Comp.	Meal Prot. %
DK 433	3170	50.3	74.5	122	147	442	59.9	96	48.0
72001	3099	50.0	74.5	122	153	444	48.9	92	46.5
A61030	3076	50.7	70	114	139	456	53.5	96	47.7
DO 707	3017	49.4	68	117	142	454	54.0		46.8
8713	2955	50.1	71	120.5	142	458	47.4	97	44.3
Sunb. 268	2938	49.4	71	114	148	429	61.4	95	49.8
C16230	2906	49.0	74	119.5	151	454	46.1	90	46.9
3840	2897	50.1	74.5	117	154	460	42.1	96	48.3
IS 3311	2858	51.9	75	122	157	455	48.3	96	45.5
DK 399	2842	50.4	70	114	135	416	46.5	94	44.3
SF 103	2839	45.8	73	116	161	463	49.8		48.7
7101	2813	49.6	73	115.5	155	443	44.4		47.3
Sig 465A	2806	48.2	72	119	145	461	46.6		49.1
S330	2805	48.7	72	120	146	456	45.9		47.4
Sig 452	2800	51.1	71	118	140	445	46.4		45.6
SF 187	2798	47.4	74.5	118.5	126	441	42.3		50.3
880165	2795	55.2	75	119	159	450	45.3	97	43.6
Capri	2785	51.9	70	117	133	444	52.2		45.6
SW 3946	2762	51.0	69	110.5	139	428	49.4	86	45.1
HO 41	2758	51.1	73	114	146	442	61.4	64	48.4
Sun S600	2721	49.3	70	114	147	449	50.7		46.1
P6440	2709	50.4	75	119	152	457	43.6		49.0
1513	2703	55.5	72	117	147	475	50.3	98	46.5
S310	2697	51.7	73.5	116	140	469	39.9	96	45.1
C207	2689	44.4	72.5	116	153	454	53.7	98	49.6
DO 164	2675	46.2	69.5	115	147	451	49.6		48.6
S314	2653	49.5	75	121	155	451	44.2	97	45.8
MRS 41	2644	51.3	75	118.5	157	439	45.0	87	46.0
MRS 45	2639	46.0	71	112	148	412	59.5	92	47.9
7111	2638	51.6	71	113.5	152	435	53.6	96	46.8
S1296	2637	50.1	68.5	112	147	457	50.0		45.9
Challenger	2625	50.7	70.5	115	147	438	46.1		46.0
Hysun 340	2623	49.5	71.5	115.5	137	407	48.0		46.6
DK 3861	2595	52.0	77	123	159	464	47.0	93	47.6
C205	2586	51.1	73	115	144	486	47.8	98	48.7
U65099	2535	51.0	70	114	148	413	55.6	98	48.0
P6240	2529	51.1	72	111.5	147	450	49.4		47.5
Cadet	2484	49.2	67	107.5	133	446	50.9		48.3
Trisun 849	2470	49.8	73	118	153	451	45.2	96	49.9
DO 855	2437	48.9	69.5	113	139	445	51.1		49.3
DO 827	2391	48.6	68	114	139	446	49.2	92	46.4
2439	2340	47.9	69	113	137	427	51.5	88	50.4
P3617	2329	52.9	73	115	148	452	47.6		45.0
7000	2310	50.0	68	111	149	422	57.8		48.3
Sig 422	2276	47.3	67	111	129	456	49.7		49.1
DK 392	2259	51.1	68	108.5	122	422	50.3	93	44.6
K 837	2249	48.6	67	106.5	163	419	59.1		46.5
Dak Gold II	2242	54.2	71	111	143	429	47.7		45.3
MRS 40	2092	49.7	68	109	132	431	47.7		47.5

Table 2 (Cont'd). Performance Data from Morden Oilseed Sunflower Trial, 1989

Hybrid	Yield kg/ha	Oil %	Days to 80% bloom	Days to maturity	Height cm	Density kg/m^3	Wt/1000 seeds, g	Self Comp.	Meal Prot. %
SW 747	2076	50.0	71	113	148	440	46.6	95	48.7
SW 7893	2068	51.8	69	107	141	422	50.6	57	43.6
Sunwheat 101	2063	43.1	64.5	108	82	422	54.0		49.1
MRS 42	1922	50.2	69	107	141	413	43.2	89	50.3
SW 7891	1870	52.1	69	106	156	426	49.0	97	46.5
880213	1841	41.9	54	100.5	79	395	64.1	80	51.9
MRS 46	1731	50.2	69	104	150	421	49.4	92	49.7
MRS 44	1616	50.0	69	105	139	397	48.1	94	46.2
Mean	2556	49.8		114	143	441	50.0		47.3
C.V. (%)	13.5	1.7		1.55	5.2	2.2	5.3		2.8
LSD	488	1.2		2.5	10	6.9	3.7		2.7

Seeded May 11 on legume stubble.

Table 3. Performance Data from Altona Oilseed Sunflower Trial, 1989

Hybrid	Yield kg/ha	Oil %	Days to 80% bloom	Days to maturity	Height cm	Density kg/m^3	Wt/1000 seeds, g	Broken stalks, %
A61030	3146	50.0	71	117	138	482	59.1	0
DK 433	3055	50.7	74	119	149	463	66.2	0
P 6440	3005	50.3	75	122	155	466	55.2	0
3861	2997	52.5	76	122	148	472	49.3	5
SF 187	2982	47.3	74	121	128	454	49.2	0
C 16230	2972	48.3	74	120	154	465	53.4	0
1513	2958	54.0	73	117	138	487	56.0	0
C 205	2933	50.9	73	117	153	493	54.0	0
Sig 452	2927	52.0	72	120	139	471	49.3	0
S 314	2926	47.9	75	124	163	452	54.3	0
SF [illegible]03	2882	45.6	73.5	119	149	481	53.2	0
S [illegible]96	2874	49.5	70.5	114.5	146	464	56.1	0
S [illegible]30	2865	48.7	72.5	122	150	477	50.4	3
DO 707	2864	50.0	71	120	138	467	52.4	3
Sun 268	2860	48.5	73	116.5	150	447	66.3	0
Challenger	2851	50.7	71	117	143	454	47.4	0
S 310	2850	51.4	73	118	139	472	43.8	0
P 6240	2781	51.5	72	113	148	474	57.8	0
Sig 465A	2781	49.0	73	121	145	478	51.0	0
Hysun 340	2746	48.8	73	119	148	418	57.2	0
MRS 41	2731	51.6	76.5	121	151	450	49.2	3
DO 855	2692	49.6	72	114	150	468	59.9	0
C 207	2628	43.7	73	119	159	499	58.8	0
DK 392	2626	52.1	69	111	133	444	53.1	0
DO 827	2536	49.4	70	117.5	141	477	53.1	3
DK 399	2535	50.2	71.5	116	131	456	53.0	0
880165	2515	54.8	75	121	148	471	45.2	0
Capri	2481	50.8	71	120	134	464	54.4	3
72001	2466	50.7	75	122	149	456	50.7	5
P 3617	2451	52.5	73	113	140	470	50.4	0
DK 3946	2439	50.5	70	112	138	439	54.5	5
K 837	2434	47.0	68	110	163	436	61.4	0
MRS 45	2419	45.1	72.5	114.5	149	438	64.6	8
Sun S600	2415	47.7	70.5	116	141	475	57.3	2
7101	2414	48.7	73	115	148	455	47.2	8
7111	2399	52.2	73	116.5	143	461	57.0	0
DO 164	2396	45.9	71.5	114	151	460	57.7	2
MRS 44	2344	50.5	69.5	105	144	399	46.8	7
8713	2340	48.8	72	123	144	486	47.7	16
Cadet	2323	48.5	69	113	136	467	50.3	0
2439	2321	47.7	70	114	139	441	55.5	16
IS 3311	2310	50.8	76	123	151	473	48.1	0
Dak. Gold II	2285	52.4	72	115	141	460	46.9	0
U 65099	2275	50.5	71	115	154	443	56.7	4
Trisun 849	2219	47.9	74	118	149	464	53.7	0
HO 41	2195	49.5	73.5	114	138	451	58.0	0
MRS 40	2145	49.2	69	113	136	452	47.4	0

(Continued)

Table 3 (Cont'd). Performance Data from Altona Oilseed Sunflower Trial, 1989

Hybrid	Yield kg/ha	Oil %	Days to 80% bloom	Days to maturity	Height cm	Density kg/m^3	Wt/1000 seeds, g	Broken stalks, %
SW 747	2132	47.8	73	111	144	438	42.6	4
DK 3840	2125	50.6	74	120	135	492	44.0	12
SW 7893	2116	50.8	70	109.5	139	437	53.5	5
MRS 46	2082	50.0	71.5	106	145	420	45.3	17
IS 7000	2072	50.2	70	114.5	143	442	60.3	6
Sig 422	2036	45.3	69	117	140	481	58.0	0
MRS 42	2009	49.1	71	107	144	422	47.2	8
SW 7891	1820	53.0	70	108	155	425	45.1	9
Sunwheat 101	1423	41.6	67	112.5	105	446	46.2	0
880213	1223	42.9	61	108	106	424	62.3	0
Mean	2502	49.4		116	143	458	53.1	2.6
C.V. (%)	17.2	1.9		1.9	8.1	2.3	8.3	231
LSD (.05)	609	1.4		3.1	16.4	15.2	6.2	8.5

Seeded May 15 on cereal stubble.

Table 4. Performance Data from Holland Oilseed Sunflower Trial, 1989

Hybrid	Yield kg/ha	Oil %	Height cm	Density kg/m^3	Wt/1000 seeds, g	Meal Protein, %
A61030	2476	49.2	167	430	46.5	42.2
Cadet	2407	49.4	163	444	47.4	42.5
Sunb 268	2402	47.6	193	392	48.8	40.8
S1296	2387	48.1	172	428	49.0	43.1
Sig 422	2376	46.0	165	453	50.4	44.6
DO 827	2344	49.2	162	441	44.6	41.1
K837	2339	49.8	191	423	54.0	43.6
DK 399	2284	49.1	164	419	44.0	41.8
DK 433	2257	48.2	167	389	53.2	41.6
DK 3946	2255	51.3	155	420	50.4	40.5
P 6240	2246	51.5	171	417	44.9	42.0
Sig 452	2242	49.0	167	417	42.6	38.0
MRS 44	2241	51.8	169	417	48.5	44.2
2439	2211	48.3	169	405	44.5	41.1
Sig 465A	2207	46.2	172	410	42.7	42.3
MRS 45	2171	44.4	177	382	55.0	41.5
7111	2150	50.4	176	396	48.0	41.8
DO 707	2131	47.9	165	413	43.8	39.9
C 207	2110	42.4	193	415	42.5	41.9
Challenger	2106	49.4	167	416	37.8	42.2
Sunwheat 101	2096	45.8	111	417	48.3	43.0
DK 392	2093	52.3	148	416	48.0	40.8
P 3617	2080	51.6	180	409	42.9	40.5
S 314	2071	45.6	172	383	40.4	41.1
880213	2059	47.3	125	419	60.4	46.4
IS 7000	2050	51.6	173	419	54.9	44.1
C 16230	2049	45.5	178	391	41.7	40.3
SW 747	2044	50.2	175	425	41.4	46.3
Sun S600	2040	47.9	173	425	48.1	42.6
8713	2037	46.1	171	410	39.8	40.4
SF 103	2032	42.8	182	402	44.7	38.2
S 310	2015	47.4	156	411	33.6	40.3
DK 3840	2008	47.9	173	400	37.4	39.1
1513	1999	54.6	167	438	42.9	40.1
P 6440	1994	48.8	173	369	39.9	41.3
Capri	1985	50.1	154	431	44.6	40.1
MRS 42	1981	50.0	171	401	51.6	42.4
SF 187	1958	44.5	156	364	39.1	43.9
DO 855	1939	49.1	176	412	49.2	40.2
S 330	1931	46.7	168	405	39.1	40.1
U 65099	1907	49.0	196	389	44.7	41.4
C 205	1906	48.8	173	414	42.4	41.9
7101	1904	47.0	177	390	37.4	39.3
DO 164	1899	46.1	184	407	44.2	39.1
Hysun 340	1893	45.0	171	355	46.1	39.9
MRS 40	1890	50.0	159	435	42.5	42.6
IS 3311	1882	48.3	187	402	38.0	40.4
SW 7891	1865	53.8	178	417	40.8	38.2
HO 41	1857	47.7	168	384	51.2	40.0

(Continued)

Table 4 (Cont'd). Performance Data from Holland Oilseed Sunflower Trial, 1989

Hybrid	Yield kg/ha	Oil %	Height cm	Density kg/m^3	Wt/1000 seeds, g	Meal Protein, %
SW 7893	1842	51.7	167	415	45.9	38.8
Dak. Gold II	1828	52.0	163	421	39.2	40.6
MRS 46	1816	51.3	167	429	46.1	39.8
3861	1773	48.1	173	385	40.9	38.8
Trisun 849	1746	46.7	181	377	40.3	42.1
880165	1739	48.4	185	365	34.3	35.5
72001	1581	45.4	180	352	39.7	38.1
MRS 41	1534	48.2	170	387	42.6	41.6
Mean	2047	48.5	143	408	44.6	41.2
C.V. %	11.9	1.9	5.2	3.4	6.0	5.6
LSD	346	1.3	16.4	19.8	3.8	4.6

Seeded May 29 on cereal stubble.

Table 5. Performance data from the Neepawa Oilseed Sunflower Trial, 1989

Hybrid	Yield kg/ha	Oil, %	Height cm	Density kg/m^3	Wt/1000 Seeds, g
DK 433	2732	49.0	109	390	52.1
A61030	2354	50.0	98	432	40.8
Capri	2286	51.6	103	436	40.3
DO 707	2248	50.0	103	436	41.5
Sig 452	2150	49.2	105	435	39.1
DK 3840	2135	49.0	106	402	34.5
S330	2121	47.1	104	427	41.3
C207	2119	42.8	115	400	42.1
PAC 9460	2111	40.2	106	406	51.1
3861	2108	49.1	110	375	35.7
1513	2066	53.2	96	433	37.5
SF 187	2062	44.2	90	350	36.3
SF 103	2033	44.5	120	391	37.9
Hysun 340	2028	48.1	99	361	38.1
P 6240	2020	50.2	109	423	38.9
MRS 45	2001	45.6	104	404	45.3
Sunb. 268	1987	46.6	114	384	45.0
MRS 42	1957	49.3	114	401	42.6
H041	1953	49.7	110	391	43.9
880165	1951	48.0	101	346	33.7
P 3617	1946	50.7	112	442	39.1
SW 7892	1941	52.5	109	425	36.7
Sig 422	1939	47.8	106	463	42.7
8713	1922	47.6	109	447	37.9
K 837	1920	48.8	123	427	44.0
S310	1918	48.7	95	415	30.3
Trisun 849	1917	47.9	111	378	35.7
U65099	1915	48.2	115	396	42.9
SW 7893	1914	53.4	109	435	42.4
P 6440	1896	47.0	108	366	36.6
Dak. Gold II	1882	50.7	101	393	39.1
S314	1854	46.0	108	366	36.7
IS 3311	1847	48.7	96	371	32.5
DO 827	1843	48.9	100	447	37.9
DO 164	1836	47.0	108	419	38.9
Sig 465A	1827	48.1	101	429	36.0
Sun S600	1823	48.6	109	455	39.3
DO 855	1799	49.5	100	441	41.0
DK 399	1798	49.7	98	449	39.0
SW 747	1777	49.7	109	428	35.0
MRS 44	1765	50.5	115	408	39.3
IS 7000	1737	51.1	105	428	44.8
DK 392	1734	53.2	100	463	38.9
72001	1734	47.1	104	370	36.5
IS 7111	1725	50.4	101	412	41.5
C16230	1719	45.9	107	381	31.7

(Continued)

Table 5 (Cont'd). Performance data from the Neepawa Oilseed Sunflower Trial, 1989

Hybrid	Yield kg/ha	Oil, %	Height cm	Density kg/m^3	Wt/1000 Seeds, g
C205	1713	48.6	100	419	37.1
S1296	1711	49.5	104	451	36.8
IS 7101	1706	46.4	103	397	34.9
Sunwheat 101	1694	44.8	73	442	38.9
MRS 46	1679	49.7	113	430	34.8
SW 7891	1671	54.3	111	435	36.5
MRS 40	1635	50.7	96	446	37.3
3946	1617	50.3	103	449	43.8
Cadet	1614	50.5	106	452	35.8
SW 7894	1583	51.0	100	459	51.6
MRS 41	1573	47.2	99	386	31.4
Challenger	1482	49.5	98	448	36.5
2439	1404	49.8	96	437	38.1
880213	1305	45.2	80	422	53.5
Sig 402	1067	43.8	76	401	49.7
Mean	1866	48.6	104	416	39.5
C.V. %	18.9	2.5	8.0	6.1	11.3
LSD (.05)	499	1.9	12	17.8	6.3

Seeded May 23 on cereal stubble.

Table 6. Performance Data from Brandon Oilseed Sunflower Trial, 1989

Hybrid	Yield kg/ha	Oil, %	Days to flower	Height cm	Wt/1000 seeds, g	Stalk Break., %	Sclerotinia %
DK 433	2738	50.6	77	131	52.7	1	23
DO 827	2466	46.4	69	131	54.5	1	2
P 3617	2411	50.5	76.5	133	50.2	5	4
Sunb. 268	2392	46.8	75	146	68.7	0	12
A61030	2382	47.3	70	110	51.9	3	5
8713	2327	47.7	75	118	53.3	10	2
HO 41	2327	48.7	76	135	57.9	1	4
C 207	2326	40.6	77	142	59.4	4	22
72001	2309	48.0	78	137	53.2	7	7
U65099	2278	47.4	70	137	59.4	11	6
Hysun 340	2247	48.9	74	124	53.7	1	12
DK 3840	2240	48.8	77	131	45.7	4	4
DK 3861	2237	50.8	78	130	44.4	4	14
MRS 41	2187	50.4	78	126	46.2	4	14
C 205	2178	48.6	78	128	51.5	2	16
C 16230	2169	44.7	76	132	51.6	11	16
IS 3311	2147	49.7	78.5	130	45.8	2	8
SW 747	2128	46.4	73	138	45.3	2	14
2439	2127	44.8	69	118	53.9	15	9
DO 707	2096	46.8	69	116	53.2	12	9
Dak. Gold II	2088	50.7	72.5	124	48.8	4	8
880165	2048	53.9	76.5	136	50.7	12	12
7111	2022	49.5	73	130	54.2	2	14
Sunwheat 101	2004	39.9	56.5	77	53.0	3	6
DK 399	1993	48.9	72	110	47.0	8	13
MRS 45	1981	43.4	72	128	56.8	9	8
7000	1981	48.2	70	119	60.2	4	24
Sig 422	1976	44.8	68	119	52.1	7	9
DK 392	1958	47.7	68	119	49.1	17	5
Cadet	1954	45.8	68	122	50.2	3	5
DO 855	1890	46.2	72	126	54.7	9	6
Challenger	1888	48.4	71	114	42.8	3	1
S314	1870	46.4	78	133	46.7	1	5
1513	1868	52.3	77	124	50.0	1	7
SW 7893	1857	47.6	69	127	52.3	23	22
S310	1823	47.9	77	117	45.0	2	16
S1296	1796	46.0	69	117	48.9	9	4
3946	1787	47.7	67.5	112	50.3	8	17
880213	1737	45.9	53.5	66	66.7	14	4
P6240	1703	48.9	75	123	46.0	12	4
SW 7891	1677	50.9	69	127	48.4	13	6
MRS 44	1633	44.2	72	124	50.0	9	9
MRS 40	1624	45.0	67	112	46.6	10	7
MRS 42	1578	46.1	71.5	122	53.1	20	16
K 837	1531	45.4	68	138	58.8	7	10
MRS 46	1471	44.9	71.5	133	44.9	18	14
Mean	2031	47.4	72.2	124	51.7	7	10
C.V. %	21.5	2.9	2.0	10.9	8.1	124	112
LSD (.05)	520	1.9	2.0	7.6	6.0	12	NS

Seeded May 9.

Table 7. Performance Data from Lyleton Oilseed Sunflower Trial, 1989

Hybrid	Yield kg/ha	Oil %	Density kg/m^3	Wt/1000 seeds, g
P 6240	2217	48.9	414	46.0
DK 392	2215	47.9	400	41.5
C 207	2068	42.5	436	40.3
MRS 42	2065	44.2	362	42.6
U 65099	1985	47.6	401	41.7
A 61030	1926	45.3	413	39.3
S 330	1915	46.1	429	40.1
880165	1913	48.0	384	33.6
DO 827	1891	47.4	431	42.4
P 3617	1867	46.6	400	37.3
DK 433	1825	46.0	393	47.2
Sunb. 268	1813	46.9	416	50.2
Capri	1809	49.3	427	40.3
C 16230	1779	46.0	415	37.4
DK 3946	1762	48.7	401	42.4
C 205	1739	47.5	436	39.3
8713	1730	47.4	447	37.1
Cadet	1719	45.5	392	37.1
DO 855	1716	46.9	423	43.1
Sig 465A	1677	45.8	418	37.4
SF 187	1672	45.8	414	34.6
DK 399	1639	45.3	411	38.2
DK 3861	1620	45.2	406	42.2
K 837	1611	42.6	385	43.0
Sun S600	1605	46.6	435	35.2
DO 164	1594	44.4	423	42.6
Challenger	1554	45.8	405	32.9
1513	1548	48.7	434	36.4
7101	1546	45.7	407	34.6
SF 103	1542	42.8	423	35.3
MRS 40	1541	45.8	400	37.4
Sig 452	1525	47.1	411	36.8
7111	1522	46.9	394	37.2
DK 3840	1517	46.5	438	34.4
Dak. Gold II	1517	47.4	394	33.6
Sunwheat 101	1510	41.8	414	40.9
SW 747	1507	45.1	393	34.6
7000	1505	47.1	397	38.3
IS 3311	1478	47.9	410	33.1
MRS 41	1461	47.4	411	39.1
SW 7891	1455	49.0	396	37.2
P 6440	1447	46.4	407	35.6
S 314	1376	42.8	391	35.6
Sig 422	1356	41.9	411	37.5
72001	1350	46.9	395	36.0
SW 7893	1344	46.7	408	42.4
MRS 46	1337	42.2	359	38.7

(Continued)

Table 7. Performance Data from Lyleton Oilseed Sunflower Trial, 1989

Hybrid	Yield kg/ha	Oil %	Density kg/m^3	Wt/1000 seeds, g
S 1296	1317	44.8	410	35.9
MRS 45	1289	40.8	371	40.1
DO 707	1272	45.7	426	33.9
S 310	1272	44.8	403	28.5
Trisun 849	1255	45.8	414	42.7
MRS 44	1223	39.4	318	34.7
HO 41	1202	43.3	363	39.1
2439	1176	44.0	400	36.2
880213	1112	39.9	371	50.4
Mean	1597	45.6		
C.V. %	27.7			
LSD	628			

Table 8. Performance data from Carievale, SK Oilseed Sunflower Trial, 1989

Hybrid	Yield kg/ha	Oil %	Wt/1000 seeds, g
C 207	3297	45.3	42.6
SF 187	2804	47.2	36.2
P 6440	2705	50.0	39.0
S 330	2673	49.4	37.5
Sig 452	2610	50.6	37.3
MRS 45	2606	47.2	45 7
DO 827	2593	49.1	38.7
Sig 465A	2584	49.3	37.3
SW 7893	2568	50.7	44.9
7111	2485	50.7	40.8
DO 707	2476	49.6	42.3
1513	2460	53.7	40.3
Sunb 268	2444	49.0	44.4
3311	2422	50.7	35.9
7000	2399	51.3	40.6
P 6240	2372	50.1	36.6
Sig 422	2371	46.7	41.1
Challenger	2352	50.7	32.8
SF 103	2339	46.5	34.9
8713	2337	49.8	35.3
PAC 9460	2303	44.9	46.3
880165	2272	51.6	33.6
7101	2237	47.5	36.6
C 205	2230	51.1	36.6
SW 747	2211	49.8	35.5
C 16230	2187	48.6	36.2
U65099	2179	50.7	35.8
DO 164	2150	47.2	39.8
SW 7891	2138	51.5	38.9
Sunwheat 101	2134	45.4	43.5
S 310	2119	49.7	38.9
SW 7892	2101	51.8	38.9
Capri	2088	51.8	40.2
MRS 42	2079	48.5	42.1
DK 3840	2071	49.8	36.7
DK 399	2068	50.8	41.0
MRS 40	2058	48.3	36.6
MRS 41	2046	49.2	36.6
DK 392	2044	51.4	39.7
2439	2028	48.2	40.7
A61030	1984	49.3	36.4
S1296	1952	49.7	36.6
72001	1951	50.1	37.4
DK 3946	1951	51.5	37.6
Dak Gold II	1937	52.2	35.2
DO 855	1926	49.2	43.2
Trisun 849	1899	48.3	38.3

(Continued)

Table 8 (Cont'd). Performance data from Carievale, SK Oilseed Sunflower Trial, 1989

Hybrid	Yield kg/ha	Oil %	Wt/1000 seeds, g
HO40	1863	47.1	39.0
S[illegible] 7894	1851	49.2	46.4
P 3617	1844	50.4	33.0
DK 3861	1839	51.1	36.2
Cadet	1791	49.5	36.5
S314	1776	48.0	35.5
K 837	1770	45.5	39.2
Sun S600	1711	48.4	38.2
DK 433	1694	49.7	43.3
HO41	1675	47.6	51.5
MRS 44	1430	45.9	34.4
MRS 46	1419	47.3	34.1
880213	1308	42.5	49.1
Sig 402	1071	45.8	39.1
Mean	2136	49.1	38.9
CV %	24.5	2.2	8.7
LSD (.05)	739	1.5	4.8

Table 9. Performance Data from the Late-seeded Morden Oilseed Sunflower Trial, 1989

Hybrid	Yield kg/ha	Oil, %	Days to 80% bloom	Days to maturity	Density kg/m^3	Wt/1000 seeds, g
K 837	2978	48.0	55	100	396	57.7
MRS 42	2974	49.2	58	101	376	57.4
S1296	2888	48.9	56	>104	419	46.8
P 6240	2855	49.6	60.5	102	379	48.0
Sig 422	2832	45.6	53.5	>104	417	47.8
Cadet	2823	50.1	55	102	418	44.5
MRS 45	2720	43.1	59	104	363	56.2
C207	2582	41.1	63	>104	397	50.1
MRS 44	2560	50.0	57	97	355	46.2
Sunwheat 101	2543	43.8	52	100	409	54.8
MRS 46	2530	49.3	58	100	388	48.6
S880213	2516	45.0	46.5	94.5	388	65.7
C205	2493	46.5	61.5	>104	397	40.8
MRS 40	2451	49.9	55	>104	397	43.3
7111	2344	48.3	60	>104	369	49.9
Sig 402	1947	41.2	49	90	372	47.1
Mean	2627	46.8				
C.V. %	6.2	1.5				
LSD (.05)	246	1.1				

Seeded June 15.

Table 10. Manitoba Sunflower Committee Trials
1988-89 Combined

Variety	Yield (kg/ha)	Oil %	Days to 80% bloom	Days to mature	Height (cm)	Density (kg/m^3)	Wt/1000 seeds (g)	Meal Protein %
SF-187	2784	46.4	72	118	125	405	46.5	46.6
DO-707	2746	48.7	67	116	137	434	48.9	44.2
Sig-452	2744	50.3	69	117	138	433	45.1	41.8
S-330	2680	47.8	70	119	143	436	44.7	43.9
C-207	2674	43.8	71	117	161	439	52.0	46.7
P-6240	2672	50.6	70	111	144	426	48.8	45.1
Capri	2662	50.5	68	116	133	434	49.7	42.9
S-1296	2660	48.9	67	113	141	441	47.2	43.3
Sig-465A	2647	47.8	70	118	141	438	45.0	45.3
SF-103	2626	45.2	72	117	159	432	48.5	43.7
Hysun 340	2623	48.6	70	117	142	384	49.3	42.9
Challenger	2607	49.7	68	114	138	420	42.1	43.2
P-6440	2596	49.1	73	119	150	414	46.4	45.9
Cadet	2596	49.7	66	109	133	438	47.9	44.5
P-3617	2574	51.5	71	113	144	429	47.4	43.2
Sun S600	2565	48.0	68	114	143	437	49.4	44.5
DO-827	2558	48.7	67	114	139	444	46.6	43.9
IS-7111	2549	50.6	70	114	143	413	51.8	45.3
MRS-45*	2545	44.2	72	113	141	408	55.2	45.1
DO-164	2541	46.5	69	114	152	425	48.9	44.6
S-310	2529	49.6	71	116	135	437	39.4	43.1
MRS-41	2523	49.9	73	119	149	415	45.8	43.2
2439	2522	47.7	69	114	141	403	51.9	45.4
DO-855	2520	48.9	69	113	145	432	51.0	45.0
S-314	2494	47.6	73	121	151	415	45.6	44.2
C-205	2483	49.6	71	114	144	446	46.5	45.0
IS-7101	2483	48.0	71	114	146	411	41.4	44.0
K-837	2454	47.2	66	108	161	409	55.8	44.6
Dakgold 2	2418	52.3	69	112	137	417	45.5	43.5
72001	2388	48.1	73	120	149	399	44.3	43.3
880213*	2199	46.2	56	106	95	412	56.7	48.2
Sig-422	2379	46.4	65	111	137	447	50.0	45.8
MRS-42	2372	49.2	68	108	145	398	52.9	44.3
IS-7000	2370	50.4	67	112	142	409	55.0	45.5
MRS-44	2349	49.1	68	105	143	382	50.0	44.3
Tri-849	2300	48.0	71	117	150	415	44.5	46.1
Sunwheat 101	2187	44.5	63	109	90	422	51.0	46.6
MRS-40	2069	48.1	67	109	129	425	43.9	45.6
Mean	2521	48.4	69	114	140	422	48.2	44.6

* Data adjusted to be comparable.

Locations included: 1988 - Holland, Lyleton, Morden, Neepawa
1989 - Altona, Holland, Morden, Neepawa

Table 11. Summary of data from the 1989 Manitoba Non-Oil Sunflower Trial (3 stations)

Hybrid	Yield kg/ha	Days to 80% Bloom	Days to Mature	Height cm	Density kg/m^3	1000 seed wt, g	% over screen 20	% over screen 18-20	% over screen 16-18	Nutmeat %
Sun G9111	2663	74	115	164	379	103	14	28	31	60.2
D131	2645	73	120	158	390	97	10	25	32	55.8
D760-2E	2591	72	120	147	403	109	17	29	31	59.2
MRS 589	2508	71.5	113	137	398	97	4	15	34	59.7
R2141	2318	71	114	173	394	96	8	28	39	57.9
974	2316	72.5	120	173	360	112	33	31	19	56.4
964	2291	70.5	111	158	371	96	11	30	34	55.9
954	2258	70.5	116	165	360	122	38	34	18	55.3
R381	2249	72	118	163	397	112	28	41	19	53.3
MRS 590	2230	71.5	115	151	421	88	0	7	24	62.2
Sun G9054	2138	73.5	117	148	380	94	12	24	29	65.5
MRS 564	1880	70	105	144	449	63	9	9	4	68.3
Mean	2341	71.8	115	157	392	99	15	24	26	59.1

Table 12. Performance data from Morden Nonoil Sunflower Trial, 1989

Hybrid	Yield kg/ha	Days to 80% bloom	Days to mature	Height cm	Density kg/m^3	1000 Seed wt/g	% over screen 20	% over screen 18-20	% over screen 16-18	Nut-meat %	Self-comp. %
D760-2E	2727	71	117	147	391	102.9	12.5	25.7	39.8	60.4	81
D131	2475	72	119.5	154	408	95.2	3.6	16.2	35.9	57.2	88
Sun G9111	2294	74	116	160	391	99.0	5.3	24.3	34.5	62.1	74
MRS 589	2271	71	112	133	406	92.8	0.5	9.4	29.8	62.6	69
Sig 954	2135	70	114	150	362	112.0	25.5	36.4	23.2	56.9	
R2141	2133	71	112	164	397	88.2	4.8	18.7	38.7	59.7	
R381	2077	70.5	118	151	403	108.1	18.9	45.7	21.8	55.8	77
MRS 590	2054	70	114.5	136	433	84.4	0	3.5	21.2	63.7	75
Sig 974	2028	72	119	166	369	108.6	23.4	33.5	21.5	59.4	
Sig 964	2004	70	111	147	371	90.1	5.5	26.5	38.5	58.0	
MRS 564	1991	67	104	138	430	58.0	0	0	2.9	70.3	57
Sun G9054	1968	73	115	146	394	92.1	6.2	23.3	29.3	67.3	32
Mean	2179	71	114	149	397	94.3	8.8	21.9	28.1	61.1	
C.V. %	9.6		1.7	3.5	1.8	7.7	51.5	24.0	20.1	3.6	
LSD (.05)	326		3.0	8.2	5.6	10.3	6.4	3.7	8.0	3.1	

Seeded May 11 on legume stubble.

Table 13. Performance data from Altona Non-Oil Sunflower Trial, 1989

Hybrid	Yield kg/ha	Days to 80% bloom	Days to maturity	Height cm	Density kg/m^3	1000 seed wt/g	% over screen 20	% over screen 18-20	% over screen 16-18	Nutmeat %
Sun G9111	3355	74	115	154	391	120.8	27.8	31.3	24.7	60.9
D131	2994	74	121	150	395	101.4	16.4	30.2	28.0	57.0
D760-2E	2727	73.5	122	138	439	124.0	31.7	28.8	23.5	60.3
MRS 589	2639	72	113	131	401	104.8	7.1	23.5	33.8	58.8
Sun G9054	2536	74	119	143	378	108.6	23.7	26.8	27.7	66.0
974	2482	73	120	164	373	122.4	38.2	30.0	18.6	57.4
R2141	2381	71.5	116	163	406	106.1	9.8	35.1	36.3	58.7
R381	2323	73	117	168	399	123.5	46.8	33.2	12.5	53.0
954	2260	71	117	155	369	130.6	53.5	26.3	13.0	57.2
964	2255	71	111	149	380	101.1	10.9	32.6	31.8	57.4
MRS 564	1454	73	107	146	460	65.0	0	0	5.6	67.3
Mean	2491	72.7	116	151	399	109.8	24.2	27.1	23.2	59.4
C.V. %	13.4		2.2	8.1	8.2	9.8	43.4	22.5	24.1	2.6
LSD (.05)	519		4.1	19	25.6	6.0	16.3	8.6	7.9	2.2

Seeded May 15

Table 14. Performance data from Holland Non-Oil Sunflower Trial, 1989

Hybrid	Yield kg/ha	Height cm	Density kg/m^3	1000 seed wt/g	% over screen 20	% over screen 18-20	% over screen 16-18	Nutmeat %
MRS 589	2615	147	387	92.3	3.4	12.3	38.6	57.8
964	2614	177	363	98.1	15.4	32.2	33.1	52.3
D131	2465	171	367	93.9	8.9	27.4	32.9	53.1
974	2439	190	337	105.8	38.5	29.9	16.6	52.3
R2141	2439	192	378	94.5	10.7	28.7	41.1	55.2
954	2380	191	349	122.4	35.1	37.9	17.7	51.8
R381	2346	171	389	105.5	18.5	43.4	23.1	51.1
Sun G9111	2340	177	354	90.3	9.3	28.8	34.9	57.7
D760-2E	2318	155	379	98.6	7.8	31.2	31.0	57.0
MRS 590	2273	171	399	93.8	0	9.8	30.1	60.1
MRS 564	2194	148	456	65.6	0	0	3.2	67.4
Sun G9054	1911	155	367	82.0	5.8	21.6	30.0	63.1
Mean	2361	170	377	94.4	12.8	25.3	27.7	56.6
C.V. %	9.1	9.2	3.1	6.5	36.4	23.9	19.1	3.2
LSD (.05)	336	24	9.0	9.5	7.3	9.4	8.2	2.8

Seeded May 29

Table 15. Two-year Performance of Non-Oil Sunflower, 1987-88 (6 station years)

Hybrid	Yield kg/ha	Days to 80% bloom	Days to mature	Height cm	Density kg/m^3	1000 Seed wt/g	% over screen			Nut-meat %	Self-comp. %
							20	18-20	16-18		
Candidate hybrids											
MRS 589	2515	69	112	129	382	94	6	20	35	59.0	68
MRS 564	2146	67.5	106	135	430	63	0	1	8	67.5	65
Registered hybrids											
D131	2458	70	117	148	377	95	13	25	31	56.6	84
974	2448	71	118	164	343	113	44	28	16	56.1	
R2141	2406	70	114	159	385	92	9	26	38	58.5	
964	2357	68	109.5	145	363	93	15	30	31	56.6	
954	2352	69.5	116	155	355	114	34	33	21	56.4	

DISEASE REACTIONS OF THE MANITOBA SUNFLOWER COOPERATIVE TEST, 1989

prepared by K. Y. Rashid

The 43 entries and 27 checks of the oilseed hybrids plus six entries and five checks of non-oil sunflower hybrids in the Manitoba Sunflower Cooperative Test were evaluated for four diseases in 1989 (table 16). Evaluation to rust race 1 was conducted under field conditions at Morden, using artificial inoculation of spreader rows in the nursery. The hybrids were also evaluated for reactions to rust in naturally infested Coop trials at Altona (predominantly race 1), at Neepawa and Lyleton (predominantly race 3). Reaction to verticillium wilt was evaluated in naturally infested field at Morden while testing to downy mildew race 2 was performed under controlled growth room conditions. Evaluation for sclerotinia wilt was conducted in naturally infested fields at Morden and Neepawa. Hot/dry weather conditions resulted in poor expression of verticillium wilt and poor spread of rust at Morden for the second consecutive year. Conditions early in the season were favorable for sclerotinia wilt infection but not for stock or head rot infections as the season progressed. This report presents the results of 2-year data on the reactions of all the Coop entries as well as a 3-year data on the reactions of selected hybrids to sclerotinia wilt (tables 17 and 18).

Reactions of the Oilseed hybrids (tables 16 and 17)

The hybrids MRS 44, IS 72001, ST 310 and ST 314 are Moderately susceptible to rust race 1, resistant or moderately resistant to verticillium wilt and downy mildew race 2. The four hybrids meet the minimum standards for disea2se resistance.

The hybrid X 2439 is moderately susceptible to rust race 1 and downy mildew race 2 but moderately resistant to verticillium wilt. This hybrid meets the minimum standards for disease resistance.

The hybrids MRS 41, MRS 45 and Hysun 340 are resistant or moderately resistant to rust race 1 and verticillium wilt but susceptible to downy mildew race 2. These hybrids do not meet the minimum standards for disease resistance.

The hybrids MRS 42 and SWT 880213 are moderately susceptible to rust race 1, moderately resistant to verticillium wilt and susceptible to downy mildew. These do not meet the minimum standards for disease resistance.

All hybrids except Hysun 340 are highly susceptible to the rust in western Manitoba (predominantly race 3).

Reactions of the Non-Oilseed Hybrids (tables 16 and 17)

The hybrid MRS 564 is moderately susceptible to rust, moderately resistant to verticillium wilt and resistant to downy mildew and thus meets the minimum standards for disease resistance. The hybrid MRS 589 is moderately susceptible to the three diseases and does not meet the minimum standards for disease resistance.

Table 16. Disease Reactions of the 1989 Oilseed Sunflower Cooperative test.

Cultivars	Reaction to Rust[1] % leaf area infected					Reaction to Verticillium Wilt[2]				Reaction to Downy Mildew[3]	Reaction to Sclerotinia Wilt[4]	
	Alt.	MRS.	Neep.	Lylt.	Mean Index	Healthy & Mild	Mod.	Severe & Dead	Mean Index	%Res	%Healthy Morden	%Healthy Neepawa
Checks												
C 205	1.0	1.8	4.1	5.0	3.0	101	1	00	1.0	82	90	93
C 207	1.0	1.4	3.0	4.0	2.4	96	3	00	1.1	12	76	94
SF 103	3.0	2.0	4.0	5.0	3.5	78	8	00	1.2	0	90	98
SF 187	1.0	1.0	3.3	5.0	2.6	94	1	00	1.0	5	98	91
XF 3617	2.0	2.6	4.0	5.0	3.4	108	2	00	1.0	60	78	91
XF 6240	1.0	1.6	2.8	5.0	2.6	89	7	00	1.2	85	96	91
XF 6440	2.0	1.4	3.8	5.0	3.1	90	3	00	1.1	83	84	86
Cadet	1.0	2.6	3.0	5.0	2.9	88	6	00	1.1	58	90	96
Capri	0.5	1.2	2.8	5.0	1.9	99	1	00	1.0	23	91	89
Challenger	1.0	1.4	2.5	5.0	2.5	104	5	00	1.1	42	93	97
Dakota Gold II	2.0	2.0	3.6	5.0	3.2	87	5	00	1.1	23	92	91
DO 164	2.0	1.4	3.2	5.0	2.9	76	8	00	1.2	93	86	97
DO 707	1.0	2.2	3.4	4.0	2.7	76	6	00	1.2	67	89	89
DO 855	1.0	1.2	3.2	5.0	2.6	81	18	00	1.4	84	90	94
IS 7000	1.0	1.8	3.8	5.0	2.9	92	10	00	1.2	18	73	83
7101	1.0	1.8	2.6	5.0	2.6	81	10	00	1.2	71	95	90
IS 7111	2.0	1.6	3.3	5.0	3.0	77	4	00	1.1	62	73	85
K 837	2.0	1.0	3.7	5.0	2.9	77	11	00	1.3	52	76	87
MRS 40	0.5	1.6	2.6	5.0	2.4	89	5	00	1.1	26	94	92
S 1296	1.0	2.0	2.6	5.0	2.7	97	4	00	1.1	52	91	91
ST 330	1.0	1.6	3.3	4.0	2.5	90	5	00	1.1	37	92	94
Sig 422	2.0	1.8	3.3	3.0	2.5	86	13	2	1.3	56	97	90
Sig 452	0.5	1.6	3.3	5.0	2.6	97	1	00	1.0	88	91	89
Sig 465A	1.0	1.8	3.3	5.0	2.8	97	7	00	1.1	84	97	92
Sun S 600	1.0	1.0	2.5	4.0	2.1	78	1	00	1.0	73	97	91
Sunwheat 101	2.0	1.8	2.8	5.0	2.9	92	10	00	1.2	58	86	91
Trisun 849	2.0	1.8	3.0	5.0	3.0	70	10	3	1.4	43	86	97
2 Year Entry												
DO 827	1.0	2.2	3.3	5.0	2.9	109	7	00	1.1	90	91	97
MRS 41	1.0	1.0	3.3	4.0	2.3	84	8	00	1.2	0	91	87
MRS 42	1.0	2.6	3.8	5.0	3.1	82	5	00	1.1	16	74	87
MRS 44	2.0	2.6	3.6	5.0	3.3	95	6	1	1.2	81	84	93
MRS 45	0.0	1.6	2.0	5.0	2.2	95	8	00	1.2	18	77	95
Hysun 340	0.0	1.2	2.8		1.3	83	14	00	1.3	6	96	93
IS 72001	2.0	2.2	3.3	5.0	3.1	89	8	00	1.2	83	91	91
ST 310	2.0	2.2	3.8	5.0	3.3	90	1	00	1.0	85	92	96
ST 314	0.5	2.6	4.3	5.0	3.1	92	2	00	1.0	76	91	91
Swt. 880213	2.0	2.8	3.6	4.0	3.1	95	4	00	1.1	30	81	85
X 2439	2.0	2.0	4.2	5.0	3.3	83	13	1	1.3	47	91	84

Table 16 (Cont'd).

Cultivars	Reaction to Rust[1] % Leaf Area Infected					Reaction to Verticillium Wilt[2]				Reaction to Downy Mildew[3]	Reaction to Sclerotinia Wilt[4]	
	Alt.	MRS	Neep.	Lylt.	Mean Index	Healthy & Mild	Mod.	Severe & Dead	Mean Index	%Res	%Healthy Morden	Neepawa
1 Year Entry												
X 16230	2.0	1.8	2.9	5.0	2.9	87	4	00	1.1	37	96	99
EX 1513	0.5	1.0	2.0	3.0	1.6	104	1	00	1.0	47	78	96
EX 8713	1.0	1.0	2.1	3.0	1.8	100	3	00	1.1	51	95	95
DK 3840	1.0	1.8	3.4	5.0	2.8	96	9	00	1.2	100	90	96
DK 3861	2.0	1.6	3.0	5.0	2.9	93	5	00	1.1	91	88	89
DK EXP 392	2.0	2.0	3.8	5.0	3.2	76	8	00	1.2	98	83	87
DK EXP 399	1.0	2.6	3.0	5.0	2.9	85	9	00	1.2	100	84	91
DK EXP 433	1.0	2.2	3.3	5.0	2.9	32	2	00	1.1	94	92	91
DK EXP 3946	2.0	1.4	3.3	5.0	2.9	82	22	00	1.4	95	85	83
IS 3311	0.5	1.4	3.1	5.0	2.5	107	2	00	1.0	63	96	96
IS A61030	1.0	1.2	2.7	4.0	2.2	96	00	00	1.0	100	98	95
IS U65099	0.5	1.0	2.5	4.0	2.0	80	8	00	1.2	52	95	84
MRS 46	1.0	1.4	3.3	4.0	2.4	81	12	00	1.3	78	77	97
PAC 9460		1.6	2.9		2.3	63	15	00	1.4	95	97	96
Sig 402		2.2	3.7		3.0	112	1	3	1.1	84	85	87
Sunbred 268	1.0	1.2	3.8	5.0	2.8	99	2	00	1.0	100	89	97
ST 880165	0.5	1.8	2.8	5.0	2.5	95	9	00	1.2	84	90	92
SWP 747	2.0	2.2	3.7	4.0	3.0	62	32	2	1.8	0	91	92
SWP 7891	2.0	1.4	3.6	5.0	3.0	73	12	1	1.3	0	89	90
SWP 7892		1.8	3.1		2.5	27	22	1	2.0	0	89	92
SWP 7893	2.0	2.0	3.4	4.0	2.9	70	3	00	1.1	0	66	92
SWP H041	1.0	2.8	4.1	5.0	3.2	78	2	00	1.1	63	98	96

Table 16 (Cont'd).

Cultivars	Reaction to Rust[1] % Leaf Area Infected					Reaction to Verticillium Wilt[2]				Reaction to Downy Mildew[3]	Reaction to Sclerotinia Wilt[4]	
	Alt.	MRS	Neep.	Lylt.	Mean Index	Healthy & Mild	Mod.	Severe & Dead	Mean Index	%Res	%Healthy Morden	%Healthy Neepawa
Non oil Checks												
D 131	1.2	5.0			3.1	63	12	5	1.6	44	70	95
RH 2141	2.6	5.0			3.8	75	17	00	1.4	48	76	98
Sig 954	3.0	5.0			4.0	81	7	00	1.2	33	88	98
Sig 964	2.2	5.0			3.6	60	22	00	1.5	11	73	89
3 Year Entry												
Sig 974	2.2	4.9			3.6	70	5	00	1.1	10	82	97
2 Year Entry												
MRS 564	2.6	4.9			3.8	70	10	00	1.3	87	85	93
MRS 589	2.2	5.0			3.6	46	17	4	1.8	30	83	98
1 Year Entry												
DO 760 2E	1.6	4.4			3.0	59	6	00	1.2	24	83	98
RE 381	2.0	5.0			3.5	67	19	00	1.4	32	94	93
Sungiant 9054	2.6	4.8			3.7	37	4	00	1.2	0	87	100
Sungiant 9111	2.4	4.9			3.7	49	6	00	1.2	0	69	100

1 Field reaction to rust at Morden and Altona (race 1 predominant), and at Neepawa and Lyleton (race 3 predominant). Indices 1 to 5 based on % leaf area infected; 1=highly resistance, 0 5%); 2=low resistance, 5 20%); 3=low susceptibility, 20 40%), 4= susceptible, 40 60% and 5=high susceptibility >60%) were assigned; they were multiplied by the % of plants in each class and the total products divided by 100 to obtain the mean disease index.

2 Reaction to verticillium wilt: Field reaction in naturally infested soil. Indices of 1 (healthy & mild), 3 (moderate) and 5 (severe & dead) were assigned; the mean disease index was obtain as described above.

3 Reaction to downy mildew: Determined under controlled conditions in growth rooms.

4 Reaction to sclerotinia wilt: Field reaction in naturally infested fields at Morden and Neepawa.

Table 17. Disease Reactions of 2 or 3 Year Sunflower Cooperative Entries to 4 Diseases.

Cultivars	Year	Reaction to Rust[1] Mean Index Morden	W. MB.	Class	Reaction to Verticillium Wilt2 Healthy & Mild %	Mod. %	Severe & Dead %	Mean Index	Class	Reaction to Downy Mildew[3] % Res.	Class	Reaction to Sclerotinia Wilt[4] %Healthy Morden	Neepawa	Class
Checks														
C 205	89	1.8	4.6		99	1	0	1.0		82		90	93	
	88	1.3	4.0		100	0	0	1.0		70		74	84	
	87	3.3			100	0	0	1.0						
		(2.1)*	(4.3)	MS				(1.0)	R	(76)	MS	(82)	(89)	MS
C 207	89	1.4	3.5		97	3	0	1.1		12		76	94	
	88	1.0	4.0		97	3	0	1.1		55		76	62	
	87	1.0			94	5	1	1.1						
		(1.1)	(3.8)	R				(1.1)	R	(34)	S	(76)	(78)	S
SF 103	89	2.0	4.5	MS	91	9	0	1.2	R	0	S	90	98	MR
	88		3.8											
			(4.2)											
SF 187	89	1.0	4.2		99	1	0	1.0		5		98	91	
	88	1.0	3.8		100	0	0	1.0		11		77	91	
	87	2.7			97	1	2	1.1		0				
		(1.6)	(4.0)	MR				(1.0)	R	(5)	S	(88)	(91)	MS
3617	89	2.6	4.5		98	2	0	1.0		60		78	91	
	88	1.7	4.5		99	1	0	1.0		100		81	81	
	87	2.0			87	7	6	1.4		71				
		(2.1)	(4.5)	MS				(1.1)	R	(77)	MS	(80)	(86)	S
6240	89	1.6	3.9		93	7	0	1.2		85		96	91	
	88	1.4	3.8		92	2	0	1.1		73		82	83	
	87	2.0			78	19	3	1.5		94				
		(1.7)	(3.9)	MS				(1.3)	MR	(84)	MR	(89)	(87)	MS
6440	89	1.4	4.4		97	3	0	1.1		83		84	86	
	88	1.5	4.5		100	0	0	1.0		97		90	83	
	87	2.0			91	7	2	1.4		90				
		(1.6)	(4.5)	MS				(1.2)	MR	(90)	MR	(87)	(85)	MS
CADET	89	2.6	4.0		94	6	0	1.1		58		90	96	
	88	1.5	4.0		98	1	1	1.1		88		81	94	
	87	3.7			95	4	1	1.1		94				
		(2.6)	(4.0)	MS				(1.1)	R	(80)	MR	(86)	(95)	MS
CAPRI	89	1.2	3.9		99	1	0	1.0		23		91	89	
	88	1.0	2.8		100	0	0	1.0		56		87	82	
	87	3.5			96	3	1	1.1		46				
		(1.9)	(3.4)	MS				(1.0)	R	(42)	S	(89)	(86)	MS

Table 17 (cont'd).

CHALLENGER	89	1.4	3.8	MR	95	5	0	1.1	R	42	S	93	97	MR
	88		3.0											
			(3.4)											
DAK.GOLD II	89	2.0	4.3	MS	95	5	0	1.1	R	23	S	92	91	MR
	88		4.5											
			(4.4)											
DO 164	89	1.4	4.1	MR	90	10	0	1.2	R	93	R	86	97	MS
	88		4.5											
			(4.3)											
DO 707	89	2.2	3.7		93	7	0	1.2		67		89	89	
	88	1.4	3.5		98	2	0	1.1		95		81	77	
	87	3.7			90	9	1	1.2		100				
		(2.4)	(3.6)	MS				(1.2)	MR	(87)	MR	(85)	(83)	MS
DO 855	89	1.2	4.1	MR	82	18	0	1.4	MS	84	MR	90	94	MR
	88		4.3											
			(4.2)											
IS 7000	89	1.8	4.4	MS	90	10	0	1.2	MR	18	S	73	83	S
	88		3.3											
			(3.9)											
7101	89	1.8	3.8		89	11	0	1.2		71		95	90	
	88	1.4	3.8		91	8	1	1.2		86		70	83	
	87	3.0			90	6	4	1.3						
		(2.1)	(3.8)	MS				(1.2)	MR	(79)	MR	(83)	(87)	MS
IS 7111	89	1.6	4.2		95	5	0	1.1		62		73	85	
	88	1.5	3.8		100	0	0	1.0		41		87	85	
	87	3.5			94	4	1	1.2				54		
		(2.2)	(4.0)	MS				(1.1)	R	(52)	MS	(71)	(85)	S
K 837	89	1.0	4.4	R	88	12	0	1.3	MR	52	S	76	87	S
	88		4.3											
			(4.4)											
MRS 40	89	1.6	3.8		95	5	0	1.1		26		94	92	
	88	1.3	3.5		99	1	0	1.0		68		87	86	
	87	2.4			95	3	2	1.2		58				
		(1.8)	(3.7)	MS				(1.1)	R	(51)	MS	(91)	(89)	MS
S 1296	89	2.0	3.8		96	4	0	1.1		52		91	91	
	88	1.3	3.5		94	6	0	1.1		78		92	83	
	87	2.4			89	8	3	1.3		100		82		
		(1.9)	(3.7)	MS				(1.2)	MR	(77)	MR	(88)	(87)	MS
ST 330	89	1.6	3.7	MS	95	5	0	1.1	R	37	S	92	94	MR
	88		3.8											
			(3.8)											

Table 17 (cont'd).

SIC 422	89	1.8	3.2	MS	85	13	2	1.3	MR	58	S	97	90	MR
	88		3.8											
			(3.5)											
SIC 452	89	1.6	4.2	MS	99	1	0	1.0	R	88	MR	91	89	MR
	88		4.5											
			(4.4)											
SIC 465A	89	1.8	4.2		93	7	0	1.1		84		97	92	
	88	1.3	3.5		100	0	0	1.0		97		91	78	
	87	3.4			99	1	0	1.0		94				
		(2.2)	(3.9)	MS				(1.0)	R	(92)	R	(94)	(85)	MR
SUN S600	89	1.0	3.3	R	99	1	0	1.0	R	73	MS	97	91	MR
	88		3.5											
			(3.4)											
SUNWHEAT 101	89	1.8	3.9		90	10	0	1.2		58		86	91	
	88	1.5	4.5		93	5	2	1.7		61		67	80	
	87	2.5			84	11	5	1.5		79				
		(1.9)	(4.2)	MS				(1.5)	MR	(66)	MS	(77)	(86)	S
TRISUN 849	89	1.8	4.0	MS	84	12	4	1.4	MS	43	S	86	97	MS
	88		4.5											
			(4.3)											
2 Year Entry														
DO 827	89	2.2	4.2		94	6	0	1.1		90		91	97	
	88	1.5			98	2	0	1.1		85		76	79	
		(1.9)		MS				(1.1)	R	(87)		(83)	(88)	S
MRS 41	89	1.0	3.7		91	9	0	1.2		0		91	87	
	88	1.7	3.5		100	0	0	1.0		0		76	83	
		(1.4)	(3.6)	MR				(1.1)	R	(0)	S	(84)	(85)	S
MRS 42	89	2.6	4.4		94	6	0	1.1		16		74	87	
	88	2.2	4.5		92	0	8	1.4		50		63	66	
		(2.4)	(4.5)	MS				(1.3)	MR	(33)	S	(69)	(77)	S
MRS 44	89	2.6	4.3		93	6	1	1.2		81		84	93	
	88	1.8	4.5		100	0	0	1.0		14		86	92	
		(2.2)	(4.4)	MS				(1.1)	R	(48)	MR/MS	(85)	(93)	MS
MRS 45	89	1.6	3.5		92	8	0	1.2		18		77	95	
	88	1.0	4.0		98	2	0	1.1		16		73	94	
		(1.3)	(3.8)	MR				(1.2)	MR	(17)	S	(75)	(95)	S
HYSUN 340	89	1.2			86	14	0	1.3		6		96	93	
	88	1.0	2.8		98	1	1	1.1		4		70	82	
		(1.1)		R				(1.2)	MR	(5)	S	(83)	(88)	S
IS 72001	89	2.2	4.2		92	8	0	1.2		83		91	91	
	88	1.3	3.8		97	3	0	1.1		100		82	88	
		(1.8)	(4.0)	MS				(1.2)	MR	(92)	R	(87)	(90)	MS

Table 17 (cont'd).

ST 310	89	2.2	4.4		99	1	0	1.0		85		92	96	
	88	1.5	4.5		99	0	1	1.1		100		81	88	
		(1.9)	(4.5)	MS				(1.1)	R	(93)	R	(87)	(92)	MS
ST 314	89	2.6	4.7		98	2	0	1.0		76		91	91	
	88	2.1	5.0		99	1	0	1.1		83		88	88	
		(2.4)	(4.9)	MS				(1.1)	R	(80)	MR	(80)	(90)	S
SWT.880213	89	2.8	3.8		96	4	0	1.1		30		81	85	
	88	2.1	4.5		79	21	0	1.5		8		76	57	
		(2.5)	(4.2)	MS				(1.3)	MR	(19)	S	(79)	(71)	S
X 2439	89	2.0	4.6		86	13	1	1.3		47		91	84	
	88	1.5	3.8		99	1	0	1.0		66		98	94	
		(1.8)	(4.2)	MS				(1.2)	MR	(57)	MS	(95)	(89)	MR
1 Year Entry														
X 16230	89	1.8	4.0	MS	96	4	0	1.1	R	37	S	96	99	MR
EX 1513	89	1.0	2.5	R	99	1	0	1.0	R	47	S	78	96	S
EX 8713	89	1.0	2.6	R	97	3	0	1.1	R	51	MS	95	95	MR
DK 3840	89	1.8	4.2	MS	91	9	0	1.2	MR	100	R	90	96	MR
DK 3861	89	1.6	4.0	MR	95	5	0	1.1	R	91	R	88	89	MS
DK EXP 392	89	2.0	4.4	MS	90	10	0	1.2	MR	98	R	83	87	MS
DK EXP 399	89	2.6	4.0	MS	90	10	0	1.2	MR	100	R	84	91	MS
DK EXP 433	89	2.2	4.2	MS	94	6	0	1.1	MR	94	R	92	91	MR
DK EXP 3946	89	1.4	4.2	MR	78	22	0	1.4	MS	95	R	85	83	MS
IS 3311	89	1.4	4.1	MR	98	2	0	1.0	R	63	MS	96	96	MR
IS A61030	89	1.2	3.4	MR	100	0	0	1.0	R	100	R	98	95	MR
IS U65099	89	1.0	3.3	R	91	9	0	1.2	MR	52	MS	95	84	MR
MRS 46	89	1.4	3.7	MR	87	13	0	1.3	MR	78	MR	77	97	S
PAC 9460	89	1.6		MR	81	19	0	1.4	MS	95	R	97	96	MR
SIC 402	89	2.2		MS	96	1	3	1.1	R	84	MR	85	87	MS
SUNBRED 268	89	1.2	4.4	MR	98	2	0	1.0	R	100	R	89	97	MR
ST 880165	89	1.8	3.9	MS	91	9	0	1.2	MR	84	MR	90	92	MR

Table 17 (cont'd).

SWP 747	89	2.2	3.9	MS	65	33	2	1.8	MS	0	S	91	92	MR
SWP 7891	89	1.4	4.3	MR	85	14	1	1.3	MR	0	S	89	90	MR
SWP 7892	89	1.8		MS	54	44	2	2.0	S	0	S	89	92	MR
SWP 7893	89	2.0	3.7	MS	96	4	0	1.1	R	0	S	66	92	S
SWP H041	89	2.8	4.6	MS	98	2	0	1.1	R	63	MS	98	96	MR
Non oil Checks														
D 131	89	1.2	5.0	MR	79	15	6	1.6	MS	44	S	70	95	S
RH 2141	89	2.6	5.0	MS	82	18	0	1.4	MS	48	S	76	98	S
SIC 954	89	3.0	5.0	S	92	8	0	1.2	MR	33	S	88	98	MR
SIC 964	89	2.2	5.0	MS	73	27	0	1.5	MS	11	S	73	89	S
3 Year Entry														
SIC 974	89	2.2	4.9		93	7	0	1.1		10		82	97	
	88													
	87			MS	88	8	4	1.4 (1.3)	MR	75 (43)	S			MS
2 Year Entry														
MRS 564	89	2.6	4.9		88	12	0	1.3		87		85	93	
	88	1.5 (2.1)		MS	98	2	0	1.1 (1.2)	MR	100 (94)	R	82 (84)		MS
MRS 589	89	2.2	5.0		69	25	6	1.8		30		83	98	
	88	1.3 (1.8)		MS	92	8	0	1.2 (1.5)	MS	73 (52)	MS	64 (74)		S
1 Year Entry														
DO 760 2E	89	1.6	4.4	MS	91	9	0	1.2	MR	24	S	83	98	MS
RH 381	89	2.0	5.0	MS	78	22	0	1.4	MS	32	S	94	93	MR
SUNCIANT 9054	89	2.6	4.8	MS	90	10	0	1.2	MR	0	S	87	100	MR
SUNCIANT 9111	89	2.4	4.9	MS	89	11	0	1.2	MR	0	S	69	100	S

1 Field reaction to rust at Morden (race 1 predominant) and in western manitoba (race 3 predominant). Indices 1 to 5 based on % leaf area infected; 1=highly resistance, 0 5%); 2=low resistance, 5 20%); 3=low susceptibility, 20 40%), 4= susceptible, 40 60% and 5=high susceptibility >60%) were assigned; they were multiplied by the % of plants in each class and the total products divided by 100 to obtain the mean disease index.

2 Reaction to verticillium wilt: Field reaction in naturally infested soil. Indices of 1 (healthy & mild), 3 (moderate) and 5 (severe & dead) were assigned; the mean disease index was obtain as described above.

3 Reaction to downy mildew: Determined under controlled conditions in growth rooms.

4 Reaction to sclerotinia wilt: Field reaction in naturally infested fields at Morden and Neepawa.

-- values are the means of 2 and 3 year results.

Table 18. Reactions to sclerotinia wilt and corresponding agronomic performance of sunflower hybrids.

Hybrids	1989*							1988*			
	% Sclerotinia Wilt		Yield		K Density	1000K wt	Oil	% Scl.	Yield	K Density	1000K wt
	Aug.1	Sept.5	kg/ha	%Red.	(kg/m^3)	(gm)	%	Aug.26	(kg/ha)	(kg/m^3)	(gm)
Sunbred 277	0.0 c**	3.7 d	1894 cd		404 e	49.7 cd	47.1 d	6.5 a	2664 a	405 ab	55.3 cd
NK2575	0.7 c	4.3 d	1649 d		396 e	47.4 d	47.8 cd	9.0 a	2242 bc	383 bcd	52.1 e
CHALLENGER	2.0 bc	6.2 cd	2445 ab	7	441 bc	45.8 d	49.9 b	12.5 ab	2602 ab	391 bc	51.0 e
EX 8713	2.3 bc	6.5 cd	2625 ab	11	459 a	46.3 d	49.6 bc				
IS A61030	4.2 abc	6.7 cd	2895 a	6	470 a	53.2 c	50.7 ab				
DO 643 11E	3.7 abc	7.7 cd	2651 a	12	442 bc	49.6 cd	50.8 ab	18.7 ab	2449 ab	404 ab	58.3 bc
ST 330	2.0 bc	7.7 cd	2038 bc	27	452 b	46.4 d	46.7 d	10.3 a	2089 bcd	415 a	53.0 de
SICCO 844	1.7 bc	9.7 cd	2010 cd		430 cd	48.2 d	47.3 d				
IS 33297	6.7 abc	11.2 bcd	2181 bc		423 d	51.6 cd	52.2 a	24.0 bcd	2436 ab	391 bc	56.2 cd
DO 707	6.8 abc	14.2 abcd	2777 a	8	440 bc	53.3 c	50.0 b				
SWP 800	4.5 abc	14.8 abcd	1584 d		402 e	48.9 cd	49.5 bc	15.3 ab	1887 cd	371 cd	52.4 de
SVKE 551	5.5 abc	14.8 abcd	2186 bc		437 c	49.4 cd	48.8 bc	19.0 ab	2843 a	408 a	56.6 c
K 837	4.5 abc	16.2 abcd	1877 cd	17	424 d	61.0 b	46.9 d	19.8 abc	1953 cd	351 ef	60.6 b
ACWAY 381	6.8 abc	17.5 abc	2092 bc	0	408 e	113.9 a	29.0 e				
CARGILL 187	8.2 ab	17.7 abc	2034 cd	27	417 d	47.2 d	46.6 d				
SWP 747	5.5 abc	17.8 abc	1492 d	28	398 e	48.1 d	49.0 bc	18.8 ab	1832 cd	368 de	54.6 cde
NK 2439	8.2 ab	23.2 ab	1957 cd	16	402 e	52.2 c	46.5 d	9.8 a	2632 a	386 bcd	65.8 a
P 6440	10.3 a	23.3 ab	2390 abc	12	429 cd	52.8 c	48.3 cd	36.0 d	2312 abc	377 cd	58.1 d
SUN M 20	10.5 a	24.7 a	1549 d		431 cd	60.0 b	49.9 b	32.0 cd	1698 d	337 f	52.8 de

* Hybrids tested in naturally infested field at Morden Research station in 2 row (20 ft) plots with 6 replications.

** Values followed by the same letter in each column are not significantly different from each other at the 5% level (Duncan Multiple Range Test).